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### **↑ ABSTRACT**

Research aimed at correcting words in text has focused on three progressively more difficult problems:(1) nonword error detection; (2) isolated-word error correction; and (3) context-dependent work correction. In response to the first problem, efficient pattern-matching and n-gram analysis techniques have been developed for detecting strings that do not appear in a given word list. In response to the second problem, a variety of general and application-specific spelling correction techniques have been developed. Some of them were based on detailed studies of spelling error patterns. In response to the third problem, a few experiments using natural-language-processing tools or statistical-language models have been carried out. This article surveys documented findings on spelling error patterns, provides descriptions of various nonword detection and isolated-word error correction techniques, reviews the state of the art of context-dependent word correction techniques, and discusses research issues related to all three areas of automatic error correction in text.

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### **↑ INDEX TERMS**

### **Primary Classification:**

I. Computing Methodologies

• 1.2 ARTIFICIAL INTELLIGENCE

→ I.2.7 Natural Language Processing

Subjects: <u>Text analysis</u>

### **Additional Classification:**

I. Computing Methodologies

← 1.2 ARTIFICIAL INTELLIGENCE

→ I.2.7 Natural Language Processing

Subjects: Language models; Language parsing and understanding

← **I.5** PATTERN RECOGNITION

→ I.5.1 Models

Subjects: Statistical; Neural nets

→ I.7.1 <u>Document and Text Editing</u>

Subjects: Spelling\*\*

### **General Terms:**

Algorithms, Experimentation, Human Factors, Performance, Theory

### **Keywords:**

n-gram analysis, Optical Character Recognition (OCR), context-dependent spelling correction, grammar checking, natural-language-processing models, neural net classifiers, spell checking, spelling error detection, spelling error patterns, statistical-language models, word recognition and correction

### **↑ REVIEW**

"Graeme J. Hirst"

It is often easy to tell when a poor speller or poor typist has used a spelling checker on a document: each word is correctly spelled, but not all are the words that the author intended. And optical character recognition of documents, with its occasional misrecognitions, has given the world a whole new source of spelling errors. Although spelling checkers (sometimes called "spell checkers" by people who need syntax checkers) have been available for many years now, there is still much room for improvement. In this paper, Kukich presents a careful and exhaustive survey of the techniques many of them fascinating and ingenious—that have been developed for efficiently finding and correcting errors in spelling; she summarizes each method and its strengths and weaknesses. The problem divides into two parts: detecting an error, which might be a non-word or a wrong real word; and correcting such errors, either in isolation or in context. Non-word detection is the easiest form of the problem, and so the simplest spelling checkers are those that merely draw the user's attention to suspect words. The main techniques used are n-gram probabilities (for example, the trigram fkh has zero chance of occurring in an English word) and lexicons of correctly spelled words (which must be neither too big nor too small). Kukich finds the former better for detecting OCR errors, the latter better for human typing. To correct the possible error, once it is found, a set of candidate corrections must be generated and ranked. These may be presented to the user for the final judgment, or the substitution may be automatic. Kukich reviews a wide variety of methods—including minimum edit distance, similarity keys, the Viterbi algorithm, and neural nets—but finds none wholly satisfactory; in particular, neural nets, which might have been thought to be ideally suited to a problem of this kind, require a prohibitive amount of training. The hardest form of the problem is the detection and correction of erroneous real words, which generally requires some linguistic knowledge (and, in the worst case, a complete understanding of the meaning of the text). For example, a parser can determine when a real-word error causes a syntax error in the sentence; this technique is the basis for many grammar-based writer's aids, such as CRITIQUE [1]. Word bigram or trigram probabilities, derived from large text corpora, can improve other techniques. Because it admits so many different kinds of approaches, spelling checking is a problem that attracts an audience from many different subfields of computing. Despite much effort and many clever ideas, it remains far from solved. Kukich's review will become the definitive reference for work done up to this point; any computer scientist will enjoy reading it. Online Computing Reviews Service

# ↑ Collaborative Colleagues:

<u>Karen Kukich</u>: <u>Kathleen McKeown</u> <u>Jacques Robin</u>

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# **Search History**

# DATE: Tuesday, December 30, 2003 Printable Copy Create Case

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DB=P	GPB, USPT, USOC, EPAB, JPAB, DWPI, TDBD; PLUR=NO; OP=OR		
<u>L8</u>	L7 and metric and vector\$2 and signal\$2 and learn\$4 and probabil\$6 and correlation and matrix	4	<u>L8</u>
<u>L7</u>	706/45.ccls.	621	<u>L7</u>
<u>L6</u>	L5 and keyword	29	<u>L6</u>
<u>L5</u>	metric and vector\$2 and signal\$2 and learn\$4 and probabil\$6 and correlation and matrix	240	<u>L5</u>
<u>L4</u>	L1 and metric and vector\$2 and signal\$2 and learn\$4 and probabil\$6 and correlation and matrix	7	<u>L4</u>
<u>L3</u>	L2 and probabil\$6 and correlation	7	<u>L3</u>
<u>L2</u>	L1 and metric and vector\$2 and signal\$2 and learn\$4	32	<u>L2</u>
<u>L1</u>	706/25.ccls.	795	<u>L1</u>

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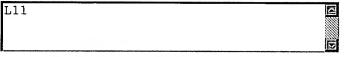
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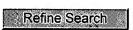
Terms	Documents
L10 and keyword	11

Database:

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# DATE: Tuesday, December 30, 2003 Printable Copy Create Case

Set Name side by side	Query	<u>Hit</u> <u>Count</u>	Set Name result set
DB=F	PGPB, USPT, USOC, EPAB, JPAB, DWPI, TDBD; PLUR=NO; OP=OR		
<u>L11</u>	L10 and keyword	11	<u>L11</u>
<u>L10</u>	L9 and measure	378	<u>L10</u>
<u>L9</u>	quantitative and vector\$2 and signal\$2 and learn\$4 and probabil\$6 and correlation and matrix	431	<u>L9</u>
<u>L8</u>	L7 and metric and vector\$2 and signal\$2 and learn\$4 and probabil\$6 and correlation and matrix	4	<u>L8</u>
<u>L7</u>	706/45.ccls.	621	<u>L7</u>
<u>L6</u>	L5 and keyword	29	<u>L6</u>
<u>L5</u>	metric and vector\$2 and signal\$2 and learn\$4 and probabil\$6 and correlation and matrix	240	<u>L5</u>
<u>L4</u>	L1 and metric and vector\$2 and signal\$2 and learn\$4 and probabil\$6 and correlation and matrix	7	<u>L4</u>
<u>L3</u>	L2 and probabil\$6 and correlation	7	<u>L3</u>

<u>L2</u>	L1 and metric and vector\$2 and signal\$2 and learn\$4	32	<u>L2</u>
<u>L1</u>	706/25.ccls.	795	<u>L1</u>

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# Search Results - Record(s) 1 through 11 of 11 returned.

☐ 1. Document ID: US 20030182246 A1

L11: Entry 1 of 11

File: PGPB

Sep 25, 2003

Sep 11, 2003

PGPUB-DOCUMENT-NUMBER: 20030182246

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20030182246 A1

TITLE: Applications of fractal and/or chaotic techniques

PUBLICATION-DATE: September 25, 2003

INVENTOR-INFORMATION:

NAME CITY STATE COUNTRY RULE-47

Johnson, William Nevil Heaton St. Peter Port GB
Blackledge, Jonathan Michael Leicester GB
Murray, Bruce Lawrence John Barcombe GB

US-CL-CURRENT: 705/76; 380/201, 380/278

110	e   Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KMC	Drawa D
			***************************************								
2	Doguma	nt ID.	110 20	020172042	Α 1						
											Title Citation Front Review Classification Date Reference Sequences Attachments Claims KMC  2. Document ID: US 20030172043 A1

File: PGPB

PGPUB-DOCUMENT-NUMBER: 20030172043

PGPUB-FILING-TYPE: new

L11: Entry 2 of 11

DOCUMENT-IDENTIFIER: US 20030172043 A1

TITLE: Methods of identifying patterns in biological systems and uses thereof

PUBLICATION-DATE: September 11, 2003

INVENTOR-INFORMATION:

NAME CITY STATE COUNTRY RULE-47

Guyon, Isabelle Berkeley CA US Weston, Jason St. Leonard's on Sea GB

US-CL-CURRENT: 706/48

Full Title Citation Front Review Classification Date Reference Sequences Attachments Claims KMC Draw. De

☐ 3. Document ID: US 20030162219 A1

L11: Entry 3 of 11

File: PGPB

Aug 28, 2003

PGPUB-DOCUMENT-NUMBER: 20030162219

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20030162219 A1

TITLE: Methods for predicting functional and structural properties of polypeptides

using sequence models

PUBLICATION-DATE: August 28, 2003

INVENTOR-INFORMATION:

NAME CITY STATE COUNTRY RULE-47

Sem, Daniel S. San Diego CA US
Baker, Brian Poway CA US
Hansen, Mark R. San Diego CA US

US-CL-CURRENT: 435/7.1; 702/19

Full Title Citation Front Review Classification Date Reference Sequences Attachments Claims KWC Draw. De

☐ 4. Document ID: US 20020156763 A1

L11: Entry 4 of 11 File: PGPB Oct 24, 2002

PGPUB-DOCUMENT-NUMBER: 20020156763

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20020156763 A1

TITLE: Extended functionality for an inverse inference engine based web search

PUBLICATION-DATE: October 24, 2002

INVENTOR-INFORMATION:

NAME CITY STATE COUNTRY RULE-47

Marchisio, Giovanni B. Kirkland WA US

US-CL-CURRENT: 707/1

Full Title Citation Front Review Classification Date Reference Sequences Attachments Claims KMC Draw De

☐ 5. Document ID: US 20020151992 A1

Ll1: Entry 5 of 11 File: PGPB Oct 17, 2002

Record List Display Page 3 of 6

PGPUB-DOCUMENT-NUMBER: 20020151992

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20020151992 A1

TITLE: Media recording device with packet data interface

PUBLICATION-DATE: October 17, 2002

INVENTOR-INFORMATION:

NAME CITY STATE COUNTRY RULE-47

Hoffberg, Steven M.
Hoffberg-Borghesani, Linda I.

West Harrison NY US Acton MA US

US-CL-CURRENT: 700/83; 700/17, 700/18, 700/86, 700/87

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KMC	Draw, De

## ☐ 6. Document ID: US 20020069218 A1

L11: Entry 6 of 11

File: PGPB

Jun 6, 2002

PGPUB-DOCUMENT-NUMBER: 20020069218

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20020069218 A1

TITLE: System and method for indexing, searching, identifying, and editing portions

of electronic multimedia files

PUBLICATION-DATE: June 6, 2002

### INVENTOR-INFORMATION:

CITY	STATE	COUNTRY	RULE-47
Seoul		KR	
Seoul		KR	
Seoul		KR	
Sungnam City		KR	
Seoul		KR	
Suwon City		KR	
Songnam City		KR	
Cheju City		KR	
Cheju City		KR	
	Seoul Seoul Seoul Sungnam City Seoul Seoul Seoul Seoul Seoul Seoul Seoul City Songnam City Cheju City	Seoul Seoul Sungnam City Seoul Seoul Seoul Seoul Seoul Seoul Seoul Seoul City Cheju City	Seoul KR Seoul KR Seoul KR Sungnam City KR Seoul KR Seoul KR Seoul KR Seoul KR Seoul KR Seoul KR Soul KR Seoul KR Cheju City KR

US-CL-CURRENT: 715/501.1

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Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KWIC	Draw, De

Record List Display Page 4 of 6

☐ 7. Document ID: US 6640145 B2

L11: Entry 7 of 11

File: USPT

Oct 28, 2003

US-PAT-NO: 6640145

DOCUMENT-IDENTIFIER: US 6640145 B2

TITLE: Media recording device with packet data interface

DATE-ISSUED: October 28, 2003

INVENTOR-INFORMATION:

NAME CITY STATE ZIP CODE COUNTRY

Hoffberg; Steven West Harrison NY 10604 Hoffberg-Borghesani; Linda Acton MA 01720

US-CL-CURRENT: 700/83; 700/17, 700/19, 700/23, 704/200, 704/201, 704/7, 709/200, 709/201, 709/202

Full Title Citation Front Review Classification Date Reference Conference Attachnetic Claims KMC Draw. De

□ 8. Document ID: US 6400996 B1

L11: Entry 8 of 11

File: USPT

Jun 4, 2002

US-PAT-NO: 6400996

DOCUMENT-IDENTIFIER: US 6400996 B1

TITLE: Adaptive pattern recognition based control system and method

DATE-ISSUED: June 4, 2002

INVENTOR-INFORMATION:

NAME CITY STATE ZIP CODE COUNTRY

Hoffberg; Steven M. West Harrison NY 10994 Hoffberg-Borghesani; Linda I. Acton MA 01720

US-CL-CURRENT: 700/83; 345/810, 345/840, 345/841, 370/218, 370/355, 700/17, 700/24, 700/25, 700/86, 700/87, 709/102, 709/223, 709/227, 709/318

Full Title Citation Front Review Classification Date Reference Services Attenuates Claims KMC Draw, D.

☐ 9. Document ID: US 6341372 B1

L11: Entry 9 of 11

File: USPT

Jan 22, 2002

US-PAT-NO: 6341372

DOCUMENT-IDENTIFIER: US 6341372 B1

TITLE: Universal machine translator of arbitrary languages

Record List Display Page 5 of 6

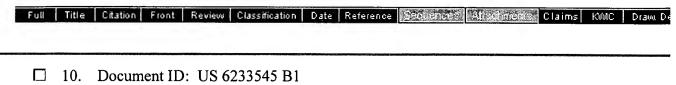
DATE-ISSUED: January 22, 2002

INVENTOR-INFORMATION:

NAME CITY STATE ZIP CODE COUNTRY

Datig; William E. Centerport NY 11721

US-CL-CURRENT: 717/136; 715/523



L11: Entry 10 of 11

File: USPT

May 15, 2001

US-PAT-NO: 6233545

DOCUMENT-IDENTIFIER: US 6233545 B1

TITLE: Universal machine translator of arbitrary languages utilizing epistemic

moments

DATE-ISSUED: May 15, 2001

INVENTOR-INFORMATION:

NAME CITY STATE ZIP CODE COUNTRY

Centerport Datig; William E. NY 11721

US-CL-CURRENT: 704/2; 704/9, 706/62

Full	Title	Citation	Front	Review	Classification	Date	Reference	- 20 1 10-6	Afternoon	Claims	KWIC	Draw, De

### ☐ 11. Document ID: US 5544256 A

L11: Entry 11 of 11

File: USPT Aug 6, 1996

US-PAT-NO: 5544256

DOCUMENT-IDENTIFIER: US 5544256 A

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TITLE: Automated defect classification system

DATE-ISSUED: August 6, 1996

INVENTOR-INFORMATION:

NAME CITY STATE ZIP CODE COUNTRY Brecher; Virginia H. West Cornwall CT Chou; Paul B.-L, Montvale NJ

Hall; Robert W. Jericho VT Parisi; Debra M. Carmel NY

Rao; Ravishankar White Plains NY Riley; Stuart L. Colchester VT Sturzenbecker; Martin C.

Carmel

NY

US-CL-CURRENT: 382/149; 382/159, 706/900

Full	Title	Citation	Front	Review	Classification	Date	Reference	Зенислоск	Mein.	d⊗ Claims	KWIC	Draw, D
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1 Session 9: image indexing and retrieval: DynDex: a dynamic and non-metric space indexer

King-Shy Goh, Beitao Li, Edward Chang

December 2002 Proceedings of the tenth ACM international conference on Multimedia

Full text available: Dpdf(648.47 KB) Additional Information: full citation, abstract, references, citings

To date, almost all research work in the Content-Based Image Retrieval (CBIR) community has used Minkowski-like functions to measure similarity between images. In this paper, we first present a non-metric distance function, dynamic partial function (DPF), which works significantly better than Minkowski-like functions for measuring perceptual similarity; and we explain DPF's link to similarity theories in cognitive science. We then propose DynDex, an indexing method that deals with both the dynam ...

Keywords: high-dimensional index, non-metric distance function, similarity search

Video Processing: Multimedia edges: finding hierarchy in all dimensions Malcolm Slaney, Dulce Ponceleon, James Kaufman October 2001 Proceedings of the ninth ACM international conference on Multimedia

Full text available: 7 pdf(6.41 MB)

Additional Information: full citation, abstract, references

This paper describes a new unified representation for the informaction in a video. We reduce the dimensionality of the signal with either a singular-value decomposition (on the semantic and image data) or mel-frequency cepstral coefficients (on the audio data) and then concatenate the vectors to form a multi-dimensional representation of the video. Using scale-space techniques we find large jumps in the video's path, which we call edges. We use these techaniques to analyze the temporal properti ...

Keywords: audio, automatic segmentation, color space, hierarchy, images, latent semantic indexing, multimedia, video, scale space, semantic space, singular-value decomposition, temporal properties

3 Picture Processing by Computer Azriel Rosenfeld September 1969 ACM Computing Surveys (CSUR), Volume 1 Issue 3



Full text available: pdf(2.69 MB)

Additional Information: full citation, references, citings, index terms

4 Speech and gaze: A multimodal learning interface for grounding spoken language in sensory perceptions



Chen Yu, Dana H. Ballard

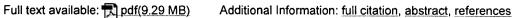
November 2003 Proceedings of the 5th international conference on Multimodal interfaces

Full text available: pdf(849.56 KB) Additional Information: full citation, abstract, references, index terms

Most speech interfaces are based on natural language processing techniques that use predefined symbolic representations of word meanings and process only linguistic information. To understand and use language like their human counterparts in multimodal humancomputer interaction, computers need to acquire spoken language and map it to other sensory perceptions. This paper presents a multimodal interface that learns to associate spoken language with perceptual features by being situated in users ...

**Keywords**: language acquisition, machine learning, multimodal integration

<sup>5</sup> Clustered principal components for precomputed radiance transfer Peter-Pike Sloan, Jesse Hall, John Hart, John Snyder July 2003 ACM Transactions on Graphics (TOG), Volume 22 Issue 3



We compress storage and accelerate performance of precomputed radiance transfer (PRT), which captures the way an object shadows, scatters, and reflects light. PRT records over many surface points a transfer matrix. At run-time, this matrix transforms a vector of spherical harmonic coefficients representing distant, low-frequency source lighting into exiting radiance. Per-point transfer matrices form a high-dimensional surface signal that we compress using clustered principal component analysi ...

**Keywords**: graphics hardware, illumination, monte carlo techniques, rendering, shadow algorithms

Three-dimensional object recognition

Paul J. Besl, Ramesh C. Jain

March 1985 ACM Computing Surveys (CSUR), Volume 17 Issue 1

Additional Information: full citation, abstract, references, citings, index Full text available: pdf(7.76 MB) terms, review

A general-purpose computer vision system must be capable of recognizing threedimensional (3-D) objects. This paper proposes a precise definition of the 3-D object recognition problem, discusses basic concepts associated with this problem, and reviews the relevant literature. Because range images (or depth maps) are often used as sensor input instead of intensity images, techniques for obtaining, processing, and characterizing range data are also surveyed.

7 Towards the ultimate APL-TOE

Gérard A. Langlet

July 1992 ACM SIGAPL APL Qu te Quad, Proceedings of the international conference on APL, Volume 23 Issue 1

Full text available: pdf(1.69 MB)

Additional Information: full citation, abstract, references, citings, index terms

This paper presents the results of more than 10 years of transdisciplinary work. The initial idea was: can the laws of Nature also been found of rebuilt, independently from theoretical research in Physics (on elementary particles and matter in general), also in the field of Computer Science i.e. Information Processing? Pressing a lemon reveals its juice and stones; if one "tortures" matter, the components of its (first electrons, neutrons and protons, then quarks and gluons at a ...

Keywords: APL, Fibonacci, T.O.E., automata, binary algebra, chaos, dynamical systems, fractals, genetics, holography, integrals, parity, periodic systems, propagation, symmetry, topology

# 8 Computational strategies for object recognition

Paul Suetens, Pascal Fua, Andrew J. Hanson

March 1992 ACM Computing Surveys (CSUR), Volume 24 Issue 1

Full text available: pdf(6.37 MB)

Additional Information: full citation, abstract, references, citings, index terms, review

This article reviews the available methods for automated identification of objects in digital images. The techniques are classified into groups according to the nature of the computational strategy used. Four classes are proposed: (1) the simplest strategies, which work on data appropriate for feature vector classification, (2) methods that match models to symbolic data structures for situations involving reliable data and complex models, (3) approaches that fit models to the photometry and ...

**Keywords**: image understanding, model-based vision, object recognition

# <sup>9</sup> Computing curricula 2001

September 2001 Journal on Educational Resources in Computing (JERIC)

Full text available: pdf(613.63 KB) html(2.78 KB)

Additional Information: full citation, references, citings, index terms

# <sup>10</sup> A survey of methods for recovering quadrics in triangle meshes

Sylvain Petitjean

June 2002 ACM Computing Surveys (CSUR), Volume 34 Issue 2

Full text available: pdf(3.91 MB) Additional Information: full citation, abstract, references, index terms

In a variety of practical situations such as reverse engineering of boundary representation from depth maps of scanned objects, range data analysis, model-based recognition and algebraic surface design, there is a need to recover the shape of visible surfaces of a dense 3D point set. In particular, it is desirable to identify and fit simple surfaces of known type wherever these are in reasonable agreement with the data. We are interested in the class of quadric surfaces, that is, algebraic surfa ...

**Keywords**: Data fitting, geometry enhancement, local geometry estimation, mesh fairing, shape recovery

11 Research track: Visualizing changes in the structure of data for exploratory feature selection

Elias Pampalk, Werner Goebl, Gerhard Widmer

August 2003 Proceedings of the ninth ACM SIGKDD international conference on Knowledge discovery and data mining



Full text available: pdf(642.44 KB) Additional Information: full citation, abstract, references, index terms

Using visualization techniques to explore and understand high-dimensional data is an efficient way to combine human intelligence with the immense brute force computation power available nowadays. Several visualization techniques have been developed to study the cluster structure of data, i.e., the existence of distinctive groups in the data and how these clusters are related to each other. However, only few of these techniques lend themselves to studying how this structure changes if the feature ...

Keywords: high-dimensional data, interactive data mining

12 Progress in Picture Processing: 1969--71

Azriel Rosenfeld

June 1973 ACM Computing Surveys (CSUR), Volume 5 Issue 2

Full text available: pdf(2.34 MB) Additional Information: full citation, references, citings, index terms

13 The principled design of large-scale recursive neural network architectures--dag-rnns and the protein structure prediction problem

Pierre Baldi, Gianluca Pollastri

September 2003 The Journal of Machine Learning Research, Volume 4

Full text available: pdf(231.40 KB) Additional Information: full citation, abstract

We describe a general methodology for the design of large-scale recursive neural network architectures (DAG-RNNs) which comprises three fundamental steps: (1) representation of a given domain using suitable directed acyclic graphs (DAGs) to connect visible and hidden node variables; (2) parameterization of the relationship between each variable and its parent variables by feedforward neural networks; and (3) application of weight-sharing within appropriate subsets of DAG connections to capture s ...

14 Partial-order transport service for multimedia and other applications Paul D. Amer, Christophe Chassot, Thomas J. Connolly, Michel Diaz, Phillip Conrad October 1994 IEEE/ACM Transactions on Networking (TON), Volume 2 Issue 5

Full text available: pdf(1.56 MB) Additional Information: full citation, references, citings, index terms

15 Optimal communication algorithms for regular decompositions on the hypercube G. C. Fox, W. Furmanski

January 1988 Proceedings of the third conference on Hypercube concurrent computers and applications: Architecture, software, computer systems, and general issues - Volume 1

Additional Information: full citation, abstract, references, citings, index Full text available: Ddf(4.81 MB)

We discuss optimal communication and decomposition algorithms for a class of regular problems on concurrent computers with a hypercube topology, using a general technique we call the method of cube geodesics. We address the calculation of various transformations ( convolutions, functionals etc. ) of data distributed over the hypercube; examples are the Fast Fourier Transform, matrix algorithms, global scalar products and vector sums, sorting. These all involve long distance inter ...

16 The visual display of information in an information retrieval environment Donald B. Crouch

# September 1986 Proceedings of the 9th annual international ACM SIGIR conference on Research and development in information retrieval

Full text available: pdf(893.49 KB) Additional Information: full citation, abstract, references, citings

This paper gives an overview of the graphical techniques which have been used in the representation of information in a document collection environment. An assessment of the applicability of existing multivariate data graphical techniques to the vector space model is presented.

# 17 Load balancing loosely synchronous problems with a neural network G. C. Fox. W. Furmanski



Full text available: pdf(2.90 MB)

Additional Information: full citation, abstract, references, citings, index

Hopfield and Tank have introduced the use of neural networks for the solution of optimization problems such as the traveling salesman problem. Here we show how to generalize this method to decompose loosely synchronous problems onto parallel machines and in particular the hypercube. In this case, decomposition or load balancing can be formulated graph theoretically in terms of optimal partitioning of the computational graph into N = 2

# <sup>18</sup> Authoritative sources in a hyperlinked environment

Jon M. Kleinberg

September 1999 Journal of the ACM (JACM), Volume 46 Issue 5

Full text available: pdf(195.41 KB)

Additional Information: full citation, abstract, references, citings, index terms, review

The network structure of a hyperlinked environment can be a rich source of information about the content of the environment, provided we have effective means for understanding it. We develop a set of algorithmic tools for extracting information from the link structures of such environments, and report on experiments that demonstrate their effectiveness in a variety of context on the World Wide Web. The central issue we address within our framework is the distillation of broad search topics, ...

**Keywords**: World Wide Web, graph algorithms, hypertext structure, link analysis

# 19 MessageWorld: a new approach to facilitating asynchronous group communication Daniel E. Rose, Jeremy J. Bornstein, Kevin Tiene



Full text available: T pdf(1.04 MB)

Additional Information: full citation, references, citings, index terms

# <sup>20</sup> Kernel independent component analysis

Francis R. Bach, Michael I. Jordan

March 2003 The Journal of Machine Learning Research, Volume 3

Additional Information: full citation, abstract, references, citings, index Full text available: pdf(561.46 KB) terms

We present a class of algorithms for independent component analysis (ICA) which use contrast functions based on canonical correlations in a reproducing kernel Hilbert space. On the one hand, we show that our contrast functions are related to mutual information and have desirable mathematical properties as measures of statistical dependence. On the other

hand, building on recent developments in kernel methods, we show that these criteria and their derivatives can be computed efficiently. Minimizi ...

Keywords: Stiefel manifold, blind source separation, canonical correlations, gram matrices, incomplete Cholesky decomposition, independent component analysis, integral equations, kernel methods, mutual information, semiparametric models

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Application Number: 09/506600 Order This

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Group Art Unit: 2122

Filing Date: 02/18/2000

Effective Date: 02/18/2000

Class/Subclass: 706/045.000

Examiner Number: 75500 / KHATRI, ANIL

Application Received: 02/18/2000

Lost Case: NO

Patent Number: **6327583** 

Interference Number:

Issue Date: 12/04/2001

Unmatched Petition: NO

Date of Abandonment: 00/00/0000

L&R Code: Secrecy Code:1

Attorney Docket Number: 041-1894A

Third Level Review: NO

Secrecy Order: NO

Status: 150 /PATENTED CASE

Status Date: 11/16/2001

Confirmation Number: 7980

Oral Hearing: NO

Title of Invention: INFORMATION FILTERING METHOD AND APPARATUS FOR PREFERENTIALLY TAKING OUT INFORMATION HAVING A HIGH NECESSITY

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Application Number: 08/707565 Order This

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Examiner Number: 73753 / RHODES, JASON

Group Art Unit: 2762

Effective Date: 09/04/1996

Class/Subclass: 706/012.000

Application Received: 09/04/1996

Lost Case: NO

Datant Number: 6076

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Waiting for Response Desc.

Patent Number: <u>6076082</u>

Filing Date: 09/04/1996

Unmatched Petition: NO

Query Request

Issue Date: 06/13/2000

Unmatched Petition: NU

Date of Abandonment: 00/00/0000

<u>L&R Code:</u> Secrecy Code:1 Third Level Review: **NO** 

Secrecy Order: NO

Attorney Docket Number: 041-1894

Status Date: 05/26/2000

Status: 150 /PATENTED CASE

Confirmation Number: 4163

Oral Hearing: NO

Title of Invention: INFORMATION FILTERING METHOD AND APPARATUS FOR PREFERENTIALLY TAKING OUT INFORMATION HAVING A HIGH NECESSITY

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Similarity Metric Learning for a Variable-Kernel Classifier (1995) (Make Corrections) (51 citations)

David G. Lowe



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...labels j = 1; J. The goal is to predict the class label of a given query q. The K nearest neighbor classification method [4, 13, 16] is a simple and appealing approach to this problem: it finds the K nearest neighbors of q in the training set, and then predicts the...

...a given query x0, we need to estimate the class posterior probabilities fP (jjx)0g J j=1 . The K nearest neighbor classi cation method [13, 20] is a simple and appealing approach to this problem: it nds the K nearest neighbors of x0 in the training set, and then predicts the...

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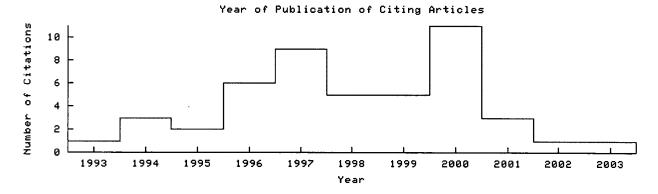
Lowe, D. G. (1995). "Similarity metric learning for a variable-kernel classifier." Neural Computation, . http://citeseer.ist.psu.edu/lowe95similarity.html <u>More</u>

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@techreport{ lowe93similarity,
    author = "David G. Lowe",
    title = "Similarity Metric Learning for a Variable-Kernel Classifier",
    number = "TR-93-43",
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year = "1993",
url = "citeseer.ist.psu.edu/lowe95similarity.html" }
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- 1 NN concepts and techniques (context) on, Theory et al. 1991

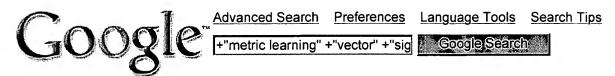


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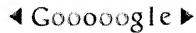
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#### [PS] Combining estimates in regression and

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... fl was determined so that the **signal** to noise ... with an adjustable (tuning) parameter **vector** fi, and ... Similarity **metric learning** for a variable kernel classifier. ... www.utstat.toronto.edu/reports/tibs/combine.ps - Similar pages

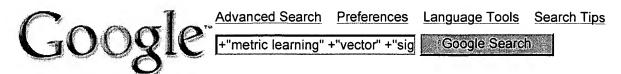


Result Page: Previous 1 2 3 4 5 Next

+"metric learning" +"vector" +"sig

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Web - Images - Groups - Directory - News - Searched the web for +"metric learning" +"vector" +"signal" +"matrix" . Results 31 - 40 of about 86. Search to

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## [PDF] LNAI 2842 - Efficiently Learning the Metric with Side- ...

File Format: PDF/Adobe Acrobat

... w  $Z \in R$  c to denote a weight **vector** in the c ... of eigenvectors used should depend on the **signal** to noise ... where W is the **matrix** containing the k eigenvectors as ... www.springerlink.com/index/Q1P2DAE1GCBLAUVK.pdf - Similar pages

#### [PS] A Review and Empirical Evaluation

File Format: Adobe PostScript - View as Text

... 29. Kohonen's (1990) learning **vector** quantization (LVQ) algorithm ... Similarity **metric learning** for a variable-kernel ... on Acoustics Speech **Signal** Processing (42.5.1 ... www.aic.nrl.navy.mil/papers/1996/AIC-96-006.ps - Similar pages

#### [PS] Tubular neighbors for regression and classification

File Format: Adobe PostScript - View as Text

... vector X. ? i. ... being tried, or perhaps there is too little signal in the ... Yianilos, PN (1995), Metric learning via normal mixtures, Technical report, NEC Research ... www-stat.stanford.edu/~owen/reports/note.ps - Similar pages

#### [PS] Locally Weighted Learning Christopher G. Atkeson

File Format: Adobe PostScript - View as Text

... h = jMj) or the magnitude of the **vector** m in ... requiring the determinant of the scaling factor **matrix** to be ... similar reasons as are used in **signal** processing and ... www.autonlab.org/autonweb/documents/ papers/atks:lcll.ps - <u>Similar pages</u>

#### [PS] Machine Learning Research: Four Current Directions

File Format: Adobe PostScript - View as Text

... A schema is a **vector** containing 0's, 1's, and ?'s. A ? in position j means ... or where the model cannot easily be converted into a transition probability **matrix**. ... www.cse.ucsc.edu/classes/cmps242/ Fall03/aimag-survey.ps - <u>Similar pages</u>

## [PDF] REPORT OF THE FINAL PANEL BOARD OF REGENTS SUPPORT FUND RESEARCH ...

File Format: PDF/Adobe Acrobat - View as HTML

... To address this issue, the following tasks will be pursued: (a) studies of flexible metric learning algorithms for content-based image retrieval, with special ... laregents.org/www2/forms/consultantrpts/ 2002reports/rcs.pdf - Similar pages

## [PS] set min duration, 131, 142 set mn weight, 85 set num res, 145 set ...

File Format: Adobe PostScript - View as Text

... Similarity **metric learning** for a variable-kernel classifier ... the initialization of the weight **vector** associated to ... instances and the whole weight **matrix** will be ... sra.itc.it/projects/charade/rr50b.ps - Similar pages

### [PS] INFERENCE AND LEARNING IN COMPLEX STOCHASTIC PROCESSES

File Format: Adobe PostScript - View as Text

... our approximation techniques can be used in para- metric learning to break ... above, the computation reduces to straightforward vector and matrix operations. ... robotics.stanford.edu/~xb/phdthesis/dissertation.ps - Similar pages

#### [PS] 3343 works that have been based on the Self-Organizing

File Format: Adobe PostScript - View as Text

... application to a data **matrix** containing a-dna and b ... Image **vector** quantization using ordered codebooks: Properties and applications ... **Signal** Processing, 40(1):87\*103 ... www.hku.nl/~pieter/EDU/neuro/doc/references.ps - Similar pages

In order to show you the most relevant results, we have omitted some entries very similar to the 40 already displayed.

If you like, you can repeat the search with the omitted results included.

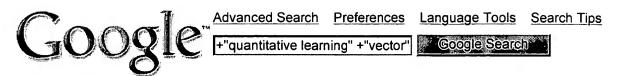
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Result Page: Previous 1 2 3 4

+"metric learning" +"vector" +"sig Google Search Search within results

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Web - Images - Groups - Directory - News - Searched the web for +"quantitative learning" +"vector" +"signal" +"matrix" . Results 1 - 6 of about 7. Search

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#### [PDF] Learning curves for stochastic gradient descent in linear ...

File Format: PDF/Adobe Acrobat - View as HTML

... We derive **quantitative learning** curves for three online training methods ... framework with a single reward **signal**, which is ... each time step an input **vector** x with ... books.nips.cc/papers/files/nips16/NIPS2003\_LT17.pdf - <u>Similar pages</u>

#### [PDF] Chapter 10. Learning

File Format: PDF/Adobe Acrobat - View as HTML

... 10.7.3. Quantitative Learning Domain. ... we shall consider a process of forcing the system to have a particular response to a specific input signal (action) by ... www.passdrexel.com/files/ ecec490meystelnotesch10learningspring2003.pdf - Similar pages

#### [PS] CONTENTS i Contents

File Format: Adobe PostScript - View as Text

... V Vapnik Support **vector** networks 15/08/97 ... G Consonni Priors for **quantitative learning** in probabilistic ... Niranjan Bayesian methods in **signal** processing problems ... www.newton.cam.ac.uk/reports/9798/appendices.ps.gz - Similar pages

#### [PDF] Technical Trading

File Format: PDF/Adobe Acrobat - View as HTML

... That is, if prices indeed were martingales, **vector** autoregressions would produce "trivial ... This will reduce the **matrix** to one possible response for each ... www.e-m-h.org/RPFK95.pdf - Similar pages

#### [PDF] Antonia J. Jones

File Format: PDF/Adobe Acrobat

... 70 Figure 6-25 The control **signal** corresponding to the ... large (near one) when the input **vector** is near ... enter the picture, or the **quantitative learning** rule that ... www.cs.cf.ac.uk/user/Antonia.J.Jones/Lectures/EvolutionaryComputation/ EvolutionaryComputing.pdf - <u>Similar pages</u>

## [PS] Causal Architecture, Complexity and Self-Organization in Time

File Format: Adobe PostScript - View as Text

... a given **signal** is proportional to the negative logarithm of the probability of the **signal**. ... method, each small region of the state-space had a **vector** field of ... cscs.umich.edu/~crshalizi/thesis/ single-spaced-thesis.ps - Similar pages

In order to show you the most relevant results, we have omitted some entries very similar to the 6 already displayed.

If you like, you can repeat the search with the omitted results included.

+"quantitative learning" +"vector" Search within results

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## **Refine Search**

#### Search Results -

Terms	Documents
L2 and probabil\$6 and correlation	7

US Pre-Grant Publication Full-Text Database

US Patents Full-Text Database US OCR Full-Text Database

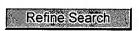
Database:

EPO Abstracts Database JPO Abstracts Database Derwent World Patents Index

IBM Technical Disclosure Bulletins

Search:

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#### **Search History**

DATE: Tuesday, December 30, 2003 Printable Copy Create Case

Set Name Query Side by side Hit Count Set Name result set

DB=PGPB, USPT, USOC, EPAB, JPAB, DWPI, TDBD; PLUR=NO; OP=OR

L2 and probabil\$6 and correlation 7 L3
L2 L1 and metric and vector\$2 and signal\$2 and learn\$4 32 L2

<u>L1</u> 706/25.ccls. 795 L1

**END OF SEARCH HISTORY** 

## **Hit List**



**Search Results -** Record(s) 1 through 7 of 7 returned.

☐ 1. Document ID: US 6009418 A

L3: Entry 1 of 7

File: USPT

Dec 28, 1999

US-PAT-NO: 6009418

DOCUMENT-IDENTIFIER: US 6009418 A

TITLE: Method and apparatus for neural networking using semantic attractor

architecture

DATE-ISSUED: December 28, 1999

INVENTOR-INFORMATION:

NAME

CITY

STATE

ZIP CODE

COUNTRY

Cooper; David L.

Fairfax

VA

22033

US-CL-CURRENT: 706/15; 706/16, 706/25, 706/26, 706/27

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sections	Allegaments	Claims	KWC	Draw, De

☐ 2. Document ID: US 5850470 A

L3: Entry 2 of 7

File: USPT

Dec 15, 1998

US-PAT-NO: 5850470

DOCUMENT-IDENTIFIER: US 5850470 A

TITLE: Neural network for locating and recognizing a deformable object

DATE-ISSUED: December 15, 1998

INVENTOR-INFORMATION:

NAME CITY STATE ZIP CODE COUNTRY

Kung; Sun-Yuan Princeton NJ
Lin; Shang-Hung Princeton NJ
Lin; Long-Ji Kendall Park NJ
Fang; Ming Cranbury NJ

US-CL-CURRENT: 382/157; 382/116, 382/117, 382/118, 382/159, 706/20, 706/25

Full Title Citation Front Review Classification Date Reference Sequences Attackments Claims KMC Draw De

Record List Display Page 2 of 4

☐ 3. Document ID: US 5774632 A

L3: Entry 3 of 7

File: USPT

Jun 30, 1998

US-PAT-NO: 5774632

DOCUMENT-IDENTIFIER: US 5774632 A

TITLE: Method and device for the control of an autonomously exploring robot

DATE-ISSUED: June 30, 1998

INVENTOR-INFORMATION:

NAME

CITY

STATE ZIP CODE

COUNTRY

Kaske; Alexander

50933 Koln

DE

US-CL-CURRENT: <u>706/25</u>; <u>700/253</u>, <u>706/15</u>

Full Title Citation Front Review Classification Date Reference Sequences Atachinence Claims KMC Draw. De

☐ 4. Document ID: US 5621861 A

L3: Entry 4 of 7

File: USPT

Apr 15, 1997

US-PAT-NO: 5621861

DOCUMENT-IDENTIFIER: US 5621861 A

TITLE: Method of reducing amount of data required to achieve neural network

learning

DATE-ISSUED: April 15, 1997

INVENTOR-INFORMATION:

NAME CITY STATE ZIP CODE COUNTRY

Hayashi; Masaaki Yokohama JP Takahashi; Takumi Yokohama JP

US-CL-CURRENT: 706/25; 706/20

Full Title Citation Front Review Classification Date Reference Sequence (Station) Claims KMC Draw De

☐ 5. Document ID: US 5568591 A

L3: Entry 5 of 7

File: USPT

Oct 22, 1996

US-PAT-NO: 5568591

DOCUMENT-IDENTIFIER: US 5568591 A

TITLE: Method and device using a neural network for classifying data

Record List Display Page 3 of 4

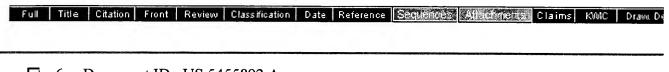
DATE-ISSUED: October 22, 1996

INVENTOR-INFORMATION:

NAME CITY STATE ZIP CODE COUNTRY

Minot; Joel Charenton FR
Gentric; Philippe Paris FR

US-CL-CURRENT: 706/25; 706/20



☐ 6. Document ID: US 5455892 A

L3: Entry 6 of 7 File: USPT Oct 3, 1995

US-PAT-NO: 5455892

DOCUMENT-IDENTIFIER: US 5455892 A

TITLE: Method for training a neural network for classifying an unknown signal with

respect to known signals

DATE-ISSUED: October 3, 1995

INVENTOR-INFORMATION:

NAME CITY STATE ZIP CODE COUNTRY

Minot; Joel Charenton FR
Gentric; Philippe Paris FR

US-CL-CURRENT: <u>706/25</u>; <u>706/20</u>

Full Title Citation Front Review Classification Date Reference Sequences Attentioneric Claims KMC Dr.	Full	Title	Citation	Front	Review	Classification	Date	Reference	Segmented	4.658	Claims	KWIC	Draw, D
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☐ 7. Document ID: US 5014219 A

L3: Entry 7 of 7 File: USPT May 7, 1991

US-PAT-NO: 5014219

DOCUMENT-IDENTIFIER: US 5014219 A

\*\* See image for <u>Certificate of Correction</u> \*\*

TITLE: Mask controled neural networks

DATE-ISSUED: May 7, 1991

INVENTOR-INFORMATION:

NAME CITY STATE ZIP CODE COUNTRY

White; James A. New Brighton MN 55112

US-CL-CURRENT: 706/25; 382/157

Full	Title	Citation	Front	Review	Classification	Date	Reference	Section 2	Attacker	ns Claims	KWIC	Draw, D
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## Refine Search

#### Search Results -

Terms	Documents
L1 and metric and vector\$2 and signal\$2 and learn\$4 and probabil\$6 and correlation and matrix	7

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L4			Refine Search
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### **Search History**

DATE: Tuesday, December 30, 2003 Printable Copy Create Case

Set Name side by side	Query	<u>Hit</u> Count	Set Name result set
DB=F	PGPB, USPT, USOC, EPAB, JPAB, DWPI, TDBD; PLUR=NO; OP=OR		
<u>L4</u>	L1 and metric and vector\$2 and signal\$2 and learn\$4 and probabil\$6 and correlation and matrix	7	<u>L4</u>
<u>L3</u>	L2 and probabil\$6 and correlation	7	<u>L3</u>
<u>L2</u>	L1 and metric and vector\$2 and signal\$2 and learn\$4	32	<u>L2</u>
<u>L1</u>	706/25.ccls.	795	L1

END OF SEARCH HISTORY

## **Hit List**



**Search Results -** Record(s) 1 through 7 of 7 returned.

☐ 1. Document ID: US 6009418 A

L4: Entry 1 of 7

File: USPT

Dec 28, 1999

US-PAT-NO: 6009418

DOCUMENT-IDENTIFIER: US 6009418 A

TITLE: Method and apparatus for neural networking using semantic attractor

architecture

DATE-ISSUED: December 28, 1999

INVENTOR-INFORMATION:

NAME

CITY

STATE

ZIP CODE

COUNTRY

Cooper; David L.

Fairfax

VA

22033

US-CL-CURRENT: 706/15; 706/16, 706/25, 706/26, 706/27

Full	Title	Citation	Front	Review	Classification	Date	Reference	Series es	Allectioneries	Claims	KWC	Draw, De

☐ 2. Document ID: US 5850470 A

L4: Entry 2 of 7

File: USPT

Dec 15, 1998

US-PAT-NO: 5850470

DOCUMENT-IDENTIFIER: US 5850470 A

TITLE: Neural network for locating and recognizing a deformable object

DATE-ISSUED: December 15, 1998

INVENTOR-INFORMATION:

NAME CITY STATE ZIP CODE COUNTRY

Kung; Sun-Yuan Princeton NJ Lin; Shang-Hung Princeton NJ

Lin; Long-Ji Kendall Park NJ Fang; Ming Cranbury NJ

US-CL-CURRENT: 382/157; 382/116, 382/117, 382/118, 382/159, 706/20, 706/25

Full Title Citation Front Review Classification Date Reference Sequences Attachments Claims KWIC Draw, De

☐ 3. Document ID: US 5774632 A

L4: Entry 3 of 7

File: USPT

Jun 30, 1998

US-PAT-NO: 5774632

DOCUMENT-IDENTIFIER: US 5774632 A

TITLE: Method and device for the control of an autonomously exploring robot

DATE-ISSUED: June 30, 1998

INVENTOR-INFORMATION:

NAME

CITY

STATE ZIP CODE

COUNTRY

Kaske; Alexander

50933 Koln

DE

US-CL-CURRENT: 706/25; 700/253, 706/15

Full	Title	Citation	Front	Review	Classification	Date	Reference	Section (G.4	Attachments	Claims	KMC	Draw, Di
								-				-

☐ 4. Document ID: US 5621861 A

L4: Entry 4 of 7

File: USPT

Apr 15, 1997

US-PAT-NO: 5621861

DOCUMENT-IDENTIFIER: US 5621861 A

TITLE: Method of reducing amount of data required to achieve neural network

learning

DATE-ISSUED: April 15, 1997

INVENTOR-INFORMATION:

NAME

CITY

STATE ZIP CODE

COUNTRY

Hayashi; Masaaki Takahashi; Takumi Yokohama Yokohama JP

JΡ

US-CL-CURRENT: 706/25; 706/20

Full Title Citation Front Review Classification Date Reference Sectionaries Affactionerits Claims KMIC Draw De

□ 5. Document ID: US 5568591 A

L4: Entry 5 of 7

File: USPT

Oct 22, 1996

US-PAT-NO: 5568591

DOCUMENT-IDENTIFIER: US 5568591 A

TITLE: Method and device using a neural network for classifying data

Record List Display Page 3 of 4

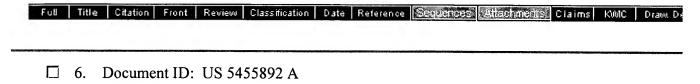
DATE-ISSUED: October 22, 1996

INVENTOR-INFORMATION:

NAME CITY STATE ZIP CODE COUNTRY

Minot; Joel Charenton FR
Gentric; Philippe Paris FR

US-CL-CURRENT: 706/25; 706/20



File: USPT

Oct 3, 1995

·

DOCUMENT-IDENTIFIER: US 5455892 A

TITLE: Method for training a neural network for classifying an unknown signal with

respect to known <u>signals</u>

L4: Entry 6 of 7

US-PAT-NO: 5455892

DATE-ISSUED: October 3, 1995

INVENTOR-INFORMATION:

NAME CITY STATE ZIP CODE COUNTRY

Minot; Joel Charenton FR
Gentric; Philippe Paris FR

US-CL-CURRENT: 706/25; 706/20

Full	Title	Citation	Front	Review	Classification	Date	Reference	Section	Attachments	Claims	KWIC	Drawi De

☐ 7. Document ID: US 5014219 A

L4: Entry 7 of 7 File: USPT May 7, 1991

US-PAT-NO: 5014219

DOCUMENT-IDENTIFIER: US 5014219 A

\*\* See image for Certificate of Correction \*\*

TITLE: Mask controled neural networks

DATE-ISSUED: May 7, 1991

INVENTOR-INFORMATION:

NAME CITY STATE ZIP CODE COUNTRY

White; James A. New Brighton MN 55112

US-CL-CURRENT: <u>706/25</u>; <u>382/157</u>

Record List Display Page 4 of 4

Full	Title Cita	tion Front	Review	Classification	Date	Reference	Sequences	Attach	ments	Claims	KWIC	Dravu D
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	Terms			<u> </u>					D	ocumer	nts	
		metric an		\$2 and sign	nal\$2	and learn	\$4 and pro	babil\$	6		7	

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WEST Refine Search Page 1 of 1

## **Refine Search**

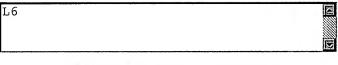
#### Search Results -

Terms	Documents
L5 and keyword	29

Database:

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EPO Abstracts Database
JPO Abstracts Database
Derwent World Patents Index
IBM Technical Disclosure Bulletins

Search:











#### **Search History**

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Set Name side by side	Query	<u>Hit</u> <u>Count</u>	<u>Set</u> <u>Name</u> result set
DB=P	PGPB, USPT, USOC, EPAB, JPAB, DWPI, TDBD; PLUR=NO; OP=OR		
<u>L6</u>	L5 and keyword	29	<u>L6</u>
<u>L5</u>	metric and vector\$2 and signal\$2 and learn\$4 and probabil\$6 and correlation and matrix	240	<u>L5</u>
<u>L4</u>	L1 and metric and vector\$2 and signal\$2 and learn\$4 and probabil\$6 and correlation and matrix	7	<u>L4</u>
<u>L3</u>	L2 and probabil\$6 and correlation	7	<u>L3</u>
<u>L2</u>	L1 and metric and vector\$2 and signal\$2 and learn\$4	32	<u>L2</u>
<u>L1</u>	706/25.ccls.	795	<u>L1</u>

**END OF SEARCH HISTORY** 

Record List Display Page 1 of 13

## **Hit List**



Search Results - Record(s) 1 through 29 of 29 returned.

☐ 1. Document ID: US 20030217047 A1

L6: Entry 1 of 29

File: PGPB

Nov 20, 2003

PGPUB-DOCUMENT-NUMBER: 20030217047

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20030217047 A1

TITLE: Inverse inference engine for high performance web search

PUBLICATION-DATE: November 20, 2003

INVENTOR-INFORMATION:

NAME CITY STATE COUNTRY RULE-47

Marchisio, Giovanni B. Kirkland WA US

US-CL-CURRENT: 707/3

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KWIC	Drawd D
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☐ 2. Document ID: US 20030182246 A1

L6: Entry 2 of 29

File: PGPB

Sep 25, 2003

PGPUB-DOCUMENT-NUMBER: 20030182246

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20030182246 A1

TITLE: Applications of fractal and/or chaotic techniques

PUBLICATION-DATE: September 25, 2003

INVENTOR-INFORMATION:

NAME CITY STATE COUNTRY RULE-47

Johnson, William Nevil Heaton St. Peter Port GB
Blackledge, Jonathan Michael Leicester GB
Murray, Bruce Lawrence John Barcombe GB

US-CL-CURRENT: <u>705/76</u>; <u>380/201</u>, <u>380/278</u>



Record List Display Page 2 of 13

☐ ·3. Document ID: US 20030172043 A1

L6: Entry 3 of 29 File: PGPB Sep 11, 2003

PGPUB-DOCUMENT-NUMBER: 20030172043

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20030172043 A1

TITLE: Methods of identifying patterns in biological systems and uses thereof

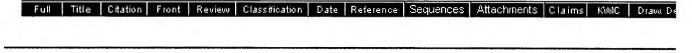
PUBLICATION-DATE: September 11, 2003

INVENTOR-INFORMATION:

NAME CITY STATE COUNTRY RULE-47

Guyon, Isabelle Berkeley CA US Weston, Jason St. Leonard's on Sea GB

US-CL-CURRENT: 706/48



☐ 4. Document ID: US 20030037041 A1

L6: Entry 4 of 29 File: PGPB Feb 20, 2003

PGPUB-DOCUMENT-NUMBER: 20030037041

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20030037041 A1

TITLE: System for automatic determination of customized prices and promotions

PUBLICATION-DATE: February 20, 2003

INVENTOR-INFORMATION:

CITY NAME STATE COUNTRY RULE-47

Hertz, Frederick S. M. Davis WV US

US-CL-CURRENT: 707/1

Full Title Citation Front Review Classification Date Reference Sequences Attachments Claims KMC Draw. De ☐ 5. Document ID: US 20020174120 A1

L6: Entry 5 of 29

File: PGPB Nov 21, 2002

PGPUB-DOCUMENT-NUMBER: 20020174120

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20020174120 A1

Record List Display Page 3 of 13

TITLE: Relevance maximizing, iteration minimizing, relevance-feedback, content-

based image retrieval (CBIR)

PUBLICATION-DATE: November 21, 2002

INVENTOR-INFORMATION:

NAME CITY STATE COUNTRY RULE-47

Zhang, Hong-Jiang Beijing CN Su, Zhong Beijing CN Zhu, Xingquan Shanghai CN

US-CL-CURRENT: 707/7

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KWIC	Draw, Di

☐ 6. Document ID: US 20020156763 A1

L6: Entry 6 of 29 File: PGPB Oct 24, 2002

PGPUB-DOCUMENT-NUMBER: 20020156763

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20020156763 A1

TITLE: Extended functionality for an inverse inference engine based web search

PUBLICATION-DATE: October 24, 2002

INVENTOR-INFORMATION:

NAME CITY STATE COUNTRY RULE-47

Marchisio, Giovanni B. Kirkland WA US

US-CL-CURRENT: 707/1

tle   Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KMC	Draw, D

☐ 7. Document ID: US 20020116196 A1

L6: Entry 7 of 29 File: PGPB Aug 22, 2002

PGPUB-DOCUMENT-NUMBER: 20020116196

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20020116196 A1

TITLE: Speech recognizer

PUBLICATION-DATE: August 22, 2002

INVENTOR-INFORMATION:

NAME CITY STATE COUNTRY RULE-47

Tran, Bao Q. San Jose CA US

Record List Display Page 4 of 13

US-CL-CURRENT: 704/270

Full Title Citation Front Review Classification Date Reference Sequences Attachments Claims KMC Draw De

□ 8. Document ID: US 20020099676 A1

L6: Entry 8 of 29 File: PGPB Jul 25, 2002

PGPUB-DOCUMENT-NUMBER: 20020099676

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20020099676 A1

TITLE: Method for filtering information including information data and keyword

attached thereto

PUBLICATION-DATE: July 25, 2002

INVENTOR-INFORMATION:

NAME CITY STATE COUNTRY RULE-47

Kindo, Toshiki Yokohama JP

US-CL-CURRENT: 706/16

Full Title Citation Front Review Classification Date Reference Sequences Attachments Claims KWIC Draw. De

☐ 9. Document ID: US 20020069218 A1

L6: Entry 9 of 29 File: PGPB Jun 6, 2002

PGPUB-DOCUMENT-NUMBER: 20020069218

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20020069218 A1

TITLE: System and method for indexing, searching, identifying, and editing portions

of electronic multimedia files

PUBLICATION-DATE: June 6, 2002

INVENTOR-INFORMATION:

NAME CITY STATE COUNTRY RULE-47 Sull, Sanghoon Seoul KR Kim, Hyeokman Seoul KR Choi, Hyungseok Seoul KR Chung, Min Gyo Sungnam City KR Yoon, Ja-Cheon Seoul KR Oh, Jeongtaek Seoul KR Lee, Sangwook Seoul KR Song, S. Moon-Ho Seoul KR Kim, Jung Rim Seoul KR Lee, Keansub Suwon City KR

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Chun, Seong Soo Songnam City KR
Oh, Sangwook Cheju City KR
Kim, Yunam Cheju City KR

US-CL-CURRENT: 715/501.1

Full Title Citation Front Review Classification Date Reference Sequences Attachments Claims KMC Draw, De

☐ 10. Document ID: US 20010047345 A1

L6: Entry 10 of 29 File: PGPB Nov 29, 2001

PGPUB-DOCUMENT-NUMBER: 20010047345

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20010047345 A1

TITLE: Information filtering method and apparatus for preferentially taking out

information having a high necessity

PUBLICATION-DATE: November 29, 2001

INVENTOR-INFORMATION:

NAME CITY STATE COUNTRY RULE-47

Kindo, Toshiki Yokohama JP

US-CL-CURRENT: 706/12

Full Title Citation Front Review Classification Date Reference Sequences Attachments Claims KWC Draw. De

☐ 11. Document ID: US 6647378 B2

L6: Entry 11 of 29 File: USPT Nov 11, 2003

US-PAT-NO: 6647378

DOCUMENT-IDENTIFIER: US 6647378 B2

TITLE: Information filtering method and apparatus for preferentially taking out

information having a high necessity

DATE-ISSUED: November 11, 2003

INVENTOR-INFORMATION:

NAME CITY STATE ZIP CODE COUNTRY

Kindo; Toshiki Yokohama JP

US-CL-CURRENT: 706/21; 706/20

Full Title Citation Front Review Classification Date Reference Sequences Attachments Claims KWIC Draw De

Record List Display Page 6 of 13

☐ 12. Document ID: US 6633878 B1

L6: Entry 12 of 29 File: USPT Oct 14, 2003

US-PAT-NO: 6633878

DOCUMENT-IDENTIFIER: US 6633878 B1

TITLE: Initializing an ecommerce database framework

DATE-ISSUED: October 14, 2003

INVENTOR-INFORMATION:

NAME CITY STATE ZIP CODE COUNTRY

Underwood; Roy Aaron Long Grove IL

US-CL-CURRENT: 707/100; 707/1, 707/102, 707/205



☐ 13. Document ID: US 6609128 B1

L6: Entry 13 of 29 File: USPT Aug 19, 2003

US-PAT-NO: 6609128

DOCUMENT-IDENTIFIER: US 6609128 B1

TITLE: Codes table framework design in an E-commerce architecture

DATE-ISSUED: August 19, 2003

INVENTOR-INFORMATION:

NAME CITY STATE ZIP CODE COUNTRY

Underwood; Roy Aaron Long Grove IL

US-CL-CURRENT: 707/10; 707/200

Full Title Citation Front Review Classification Date Reference Scottandes Attachinent Claims KWIC Draw, De

☐ 14. Document ID: US 6601233 B1

L6: Entry 14 of 29 File: USPT Jul 29, 2003

US-PAT-NO: 6601233

DOCUMENT-IDENTIFIER: US 6601233 B1

TITLE: Business components framework

DATE-ISSUED: July 29, 2003

INVENTOR-INFORMATION:

NAME CITY STATE ZIP CODE COUNTRY

Record List Display Page 7 of 13

Underwood; Roy Aaron

Long Grove IL

US-CL-CURRENT: 717/102; 717/100, 717/101, 717/103, 717/104, 717/106, 717/107

Full Title Citation Front Review Classification Date Reference Sequences Attachments Claims KMC Draw De

☐ 15. Document ID: US 6523027 B1

L6: Entry 15 of 29

File: USPT

Feb 18, 2003

US-PAT-NO: 6523027

DOCUMENT-IDENTIFIER: US 6523027 B1

TITLE: Interfacing servers in a Java based e-commerce architecture

DATE-ISSUED: February 18, 2003

INVENTOR-INFORMATION:

NAME CITY STATE ZIP CODE COUNTRY

Underwood; Roy Aaron Long Grove

US-CL-CURRENT: <u>707/4</u>; <u>707/10</u>, <u>707/100</u>

Full Title Citation Front Review Classification Date Reference Sections Attentions Claims KMC Draw. De

☐ 16. Document ID: US 6510406 B1

L6: Entry 16 of 29

File: USPT

Jan 21, 2003

US-PAT-NO: 6510406

DOCUMENT-IDENTIFIER: US 6510406 B1

TITLE: Inverse inference engine for high performance web search

DATE-ISSUED: January 21, 2003

INVENTOR-INFORMATION:

NAME CITY STATE ZIP CODE COUNTRY

Marchisio; Giovanni B. Kirkland WA

US-CL-CURRENT: 704/9; 707/3

Full Title Citation Front Review Classification Date Reference Scottanges Attachnomes Claims KMC Draw De

☐ 17. Document ID: US 6460036 B1

L6: Entry 17 of 29

File: USPT

Oct 1, 2002

US-PAT-NO: 6460036

Record List Display Page 8 of 13

DOCUMENT-IDENTIFIER: US 6460036 B1

TITLE: System and method for providing customized electronic newspapers and target

advertisements

DATE-ISSUED: October 1, 2002

INVENTOR-INFORMATION:

NAME

CITY

STATE ZIP CODE COUNTRY

Herz; Frederick S. M.

Davis

WV

US-CL-CURRENT: 707/10; 705/14, 707/2, 709/217, 725/14

Full Title Citation Front Review Classification Date Reference Sections: Attackments Claims KMC Draw De

☐ 18. Document ID: US 6341372 B1

L6: Entry 18 of 29

File: USPT

Jan 22, 2002

US-PAT-NO: 6341372

DOCUMENT-IDENTIFIER: US 6341372 B1

TITLE: Universal machine translator of arbitrary languages

DATE-ISSUED: January 22, 2002

INVENTOR-INFORMATION:

NAME

CITY

STATE

ZIP CODE

COUNTRY

Datig; William E.

Centerport

NY

11721

US-CL-CURRENT: 717/136; 715/523

Full Title Citation Front Review Classification Date Reference Sequences Attachments Claims KMC Draw De

☐ 19. Document ID: US 6336108 B1

L6: Entry 19 of 29

File: USPT

Jan 1, 2002

US-PAT-NO: 6336108

DOCUMENT-IDENTIFIER: US 6336108 B1

TITLE: Speech recognition with mixtures of bayesian networks

DATE-ISSUED: January 1, 2002

INVENTOR-INFORMATION:

NAME CITY

ZIP CODE STATE

COUNTRY

Thiesson; Bo

Woodinville

WA

Meek; Christopher A.

Kirkland

WA

Chickering; David Maxwell

Redmond

WA

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Heckerman; David Earl Bellevue WA
Alleva; Fileno A. Redmond WA
Hwang; Mei-Yuh Redmond WA

US-CL-CURRENT: 706/20; 704/256

Full Title Citation Front Review Classification Date Reference City Conces 2 Literature Claims KWIC Draw, De

☐ 20. Document ID: US 6327583 B1

L6: Entry 20 of 29 File: USPT Dec 4, 2001

US-PAT-NO: 6327583

DOCUMENT-IDENTIFIER: US 6327583 B1

TITLE: Information filtering method and apparatus for preferentially taking out

information having a high necessity

DATE-ISSUED: December 4, 2001

INVENTOR-INFORMATION:

NAME CITY STATE ZIP CODE COUNTRY

Kindo; Toshiki Yokohama JP

US-CL-CURRENT: 706/45; 706/16, 706/21

Full Title Citation Front Review Classification Date Reference **Sequences Attachments** Claims KMC Draw, De

☐ 21. Document ID: US 6286012 B1

L6: Entry 21 of 29 File: USPT Sep 4, 2001

US-PAT-NO: 6286012

DOCUMENT-IDENTIFIER: US 6286012 B1

TITLE: Information filtering apparatus and information filtering method

DATE-ISSUED: September 4, 2001

INVENTOR-INFORMATION:

NAME CITY STATE ZIP CODE COUNTRY

Kindo; Toshiki Yokohama JP Yoshida; Hideyuki Sagamihara JP Watanabe; Taisuke Sagamihara JP

US-CL-CURRENT: 707/104.1; 707/9, 709/218, 709/222

Full Title Citation Front Review Classification Date Reference Sequences Attachments Claims KMC Draw De

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☐ 22. Document ID: US 6233545 B1

L6: Entry 22 of 29 File: USPT May 15, 2001

US-PAT-NO: 6233545

DOCUMENT-IDENTIFIER: US 6233545 B1

TITLE: Universal machine translator of arbitrary languages utilizing epistemic

moments

DATE-ISSUED: May 15, 2001

INVENTOR-INFORMATION:

NAME CITY STATE ZIP CODE COUNTRY

Datig; William E. Centerport NY 11721

US-CL-CURRENT: 704/2; 704/9, 706/62



☐ 23. Document ID: US 6076082 A

L6: Entry 23 of 29 File: USPT Jun 13, 2000

US-PAT-NO: 6076082

DOCUMENT-IDENTIFIER: US 6076082 A

TITLE: Information filtering method and apparatus for preferentially taking out

information having a high necessity

DATE-ISSUED: June 13, 2000

INVENTOR-INFORMATION:

NAME CITY STATE ZIP CODE COUNTRY

Kindo; Toshiki Yokohama JP

US-CL-CURRENT: 706/12; 706/14, 707/6, 707/7

Full Title Citation Front Review Classification Date Reference Sequences Affactments Claims KWC Draw De

☐ 24. Document ID: US 6070140 A

L6: Entry 24 of 29 File: USPT May 30, 2000

US-PAT-NO: 6070140

DOCUMENT-IDENTIFIER: US 6070140 A

TITLE: Speech recognizer

DATE-ISSUED: May 30, 2000

Record List Display Page 11 of 13

INVENTOR-INFORMATION:

NAME

CITY

STATE

ZIP CODE

COUNTRY

Tran; Bao Q.

Houston

TX

77099

US-CL-CURRENT: 704/275; 704/232

Full Title Citation Front Review Classification Date Reference Securification Attachments. Claims KMC Draw De

☐ 25. Document ID: US 6029195 A

L6: Entry 25 of 29

File: USPT

Feb 22, 2000

US-PAT-NO: 6029195

DOCUMENT-IDENTIFIER: US 6029195 A

TITLE: System for customized electronic identification of desirable objects

DATE-ISSUED: February 22, 2000

INVENTOR-INFORMATION:

NAME

CITY

STATE

ZIP CODE

COUNTRY

Herz; Frederick S. M.

Davis

WV

26260

US-CL-CURRENT: 725/116; 707/10, 725/93

Full Title Citation Front Review Classification Date Reference Sexuel Ces Atteichments Claims KWIC Draw De

☐ 26. Document ID: US 5835087 A

L6: Entry 26 of 29

File: USPT

Nov 10, 1998

US-PAT-NO: 5835087

DOCUMENT-IDENTIFIER: US 5835087 A

TITLE: System for generation of object profiles for a system for customized

electronic identification of desirable objects

DATE-ISSUED: November 10, 1998

INVENTOR-INFORMATION:

NAME

CITY

STATE ZIP CODE

COUNTRY

Herz; Frederick S. M.

Davis

WV

26260

Eisner; Jason M. Ungar; Lyle H.

Philadelphia Philadelphia PA PA 19107 19103

US-CL-CURRENT: 345/810; 725/14, 725/35, 725/46

Full Title Citation Front Review Classification Date Reference Sequences Attechments Claims KMC Draw, De

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☐ 27. Document ID: US 5754939 A

L6: Entry 27 of 29 File: USPT May 19, 1998

US-PAT-NO: 5754939

DOCUMENT-IDENTIFIER: US 5754939 A

TITLE: System for generation of user profiles for a system for customized

electronic identification of desirable objects

DATE-ISSUED: May 19, 1998

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE COUNTRY
Herz; Frederick S. M.	Davis	WV	26260
Eisner; Jason M.	Philadelphia	19107	
Ungar; Lyle H.	Philadelphia	PA	19103
Marcus; Mitchell P.	Philadelphia	PA	19119

US-CL-CURRENT: 455/3.04; 709/219, 715/501.1, 725/34

Full	Title	Citation	Front	Review	Classification	Date	Reference	and the state of	Aliation	Claims	KWIC	Drawd D
	28.	Docum	ent ID	): US 5	754938 A							
L6: E	ntry	28 of	29				File:	JSPT		May	19,	1998

US-PAT-NO: 5754938

DOCUMENT-IDENTIFIER: US 5754938 A

TITLE: Pseudonymous server for system for customized electronic identification of

desirable objects

DATE-ISSUED: May 19, 1998

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Herz; Frederick S. M.	Davis	WV	26260	
Eisner; Jason M.	Philadelphia	PA	19107	
Salganicoff; Marcos	Philadelphia	PA	19130	

US-CL-CURRENT: 725/116; 705/74, 707/6, 707/9, 709/219, 713/155, 725/1, 725/129, 725/25

Full	Title	Citation	Front	Review	Classification	Date	Reference	Septemate,	Alecchinizans	Claims	KWIC	Drawu De
	<b>29</b> . ]	Docume	ent ID	: US 5	544256 A							
L6: En	try 3	29 of 2	29				File:	USPT		Aug	6,	1996

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US-PAT-NO: 5544256

DOCUMENT-IDENTIFIER: US 5544256 A

\*\* See image for Certificate of Correction \*\*

TITLE: Automated defect classification system

DATE-ISSUED: August 6, 1996

INVENTOR-INFORMATION:

NAME CITY STATE ZIP CODE COUNTRY Brecher; Virginia H. West Cornwall CTChou; Paul B.-L, Montvale NJ Hall; Robert W. Jericho VTParisi; Debra M. Carmel NY Rao; Ravishankar White Plains NY Riley; Stuart L. Colchester VTSturzenbecker; Martin C. Carmel NY

US-CL-CURRENT: 382/149; 382/159, 706/900

Full	Title	Citation	Front	Review	Classification	Date	Reference	627	All Service	(15) Claims	KWC	Draw, D
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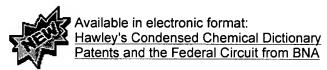
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[Abstract] [PDF Full-Text (456KB)] IEEE CNF
4 Competitive model to classify unknown data into hierarchical clust through unsupervised learning  Meki, Y.; Kindo, T.; Kurokawa, H.; Sasase, I.;  Communications, Computers and Signal Processing, 1997. '10 Years PACRIN 1997 - Networking the Pacific Rim'. 1997 IEEE Pacific Rim Conference on , V 2 , 20-22 Aug. 1997  Pages:815 - 818 vol.2  [Abstract] [PDF Full-Text (368KB)] IEEE CNF

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O- Join IEEE	Pages:521 [Abstract]	- 530 <u>[PDF Full-Text</u>	(416 KB))	IEEE CNF		
O- Access the IEEE Member Digital Library	2 Distance-from-boundary as a metric for texture image retrieval Guodong Guo; Hong-Jiang Zhang; Li, S.Z.; Acoustics, Speech, and Signal Processing, 2001. Proceedings. (ICASSP '01). 2 IEEE International Conference on , Volume: 3 , 7-11 May 2001 Pages:1629 - 1632 vol.3					
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	3 Contravariant adaptation on structured parameter spaces Moon, T.K.; Gunther, J.; Signals, Systems and Computers, 2001. Conference Record of the Thirty-Fifth Asilomar Conference on , Volume: 2 , 4-7 Nov. 2001 Pages: 936 - 940 vol.2					
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	4 An adap	tive metric lea	rning pro	cedure for	rec nfigurable	facial sign

4 An adaptive metric learning procedure for rec nfigurable facial sign authentication

Satonaka, T.; Otsuki, T.; Chikamura, T.;

Neural Networks for Signal Processing IX, 1999. Proceedings of the 1999 IEEI Signal Processing Society Workshop , 23-25 Aug. 1999

Pages: 409 - 418

[Abstract] [PDF Full-Text (380 KB)] IEEE CNF

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Neural Networks for Signal Processing [1997] VII. Proceedings of the 1997 IE Workshop , 24-26 Sept. 1997

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Watanabe, H.; Yamaguchi, T.; Katagiri, S.; Acoustics, Speech, and Signal Processing, 1995. ICASSP-95., 1995 Internatio Conference on , Volume: 5 , 9-12 May 1995

Pages: 3439 - 3442 vol. 5

[Abstract] [PDF Full-Text (348 KB)] IEEE CNF

# $^{7}$ A neural network for unsupervised categorization of multivalued in patterns: an application to satellite image clustering

Baraldi, A.; Parmiggiani, F.;

Geoscience and Remote Sensing, IEEE Transactions on , Volume: 33 , Issue: 2 , March 1995

Pages: 305 - 316

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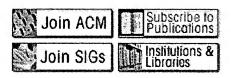
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Prior knowledge and preferential structures in gradient descent learning algorithms Robert E. Mahony, Robert C. Williamson

September 2001 The Journal of Machine Learning Research, Volume 1

Full text available: pdf(539.02 KB) Additional Information: full citation, abstract

A family of gradient descent algorithms for learning linear functions in an online setting is considered. The family includes the classical LMS algorithm as well as new variants such as the Exponentiated Gradient (EG) algorithm due to Kivinen and Warmuth. The algorithms are based on prior distributions defined on the weight space. Techniques from differential geometry are used to develop the algorithms as gradient descent iterations with respect to the natural gradient in the Riemannian structur ...

2 Surveillance: Multi-camera spatio-temporal fusion and biased sequence-data learning for security surveillance



Gang Wu, Yi Wu, Long Jiao, Yuan-Fang Wang, Edward Y. Chang

November 2003 Proceedings of the eleventh ACM international conference on Multimedia

Full text available: pdf(281.72 KB) Additional Information: full citation, abstract, references, index terms

We present a framework for multi-camera video surveillance. The framework consists of three phases: detection, representation, and recognition. The detection phase handles multi-source spatio-temporal data fusion for efficiently and reliably extracting motion trajectories from video. The representation phase summarizes raw trajectory data to construct hierarchical, invariant, and content-rich descriptions of the motion events. Finally, the recognition ph ...

A theory for memory-based learning

Jyh-Han Lin, Jeffrey Scott Vitter

July 1992 Proceedings of the fifth annual workshop on Computational learning theory

Full text available: pdf(1.24 MB)

Additional Information: full citation, abstract, references, citings, index terms

A memory-based learning system is an extended memory management system that decomposes the input space either statically or dynamically into subregions for the purpose of storing and retrieving functional information. The main generalization techniques employed by memory-based learning systems are the nearest-neighbor search, space decomposition techniques, and clustering. Research on memory-based learning is still in its early stage. In particular, there are very few rigorous theoretical r ...

4 Session 9: image indexing and retrieval: DynDex: a dynamic and non-metric space indexer



King-Shy Goh, Beitao Li, Edward Chang

December 2002 Proceedings of the tenth ACM international conference on Multimedia

Full text available: pdf(648.47 KB) Additional Information: full citation, abstract, references, citings

To date, almost all research work in the Content-Based Image Retrieval (CBIR) community has used Minkowski-like functions to measure similarity between images. In this paper, we first present a non-metric distance function, dynamic partial function (DPF), which works significantly better than Minkowski-like functions for measuring perceptual similarity; and we explain DPF's link to similarity theories in cognitive science. We then propose DynDex, an indexing method that deals with both the dynam ...

Keywords: high-dimensional index, non-metric distance function, similarity search

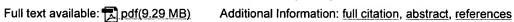
5 Supervised adaptive resonance networks

R. S. Baxter

May 1991 Proceedings of the conference on Analysis of neural network applications

Full text available: pdf(1.44 MB) Additional Information: full citation, references, index terms

Clustered principal components for precomputed radiance transfer Peter-Pike Sloan, Jesse Hall, John Hart, John Snyder July 2003 ACM Transactions on Graphics (TOG), Volume 22 Issue 3



We compress storage and accelerate performance of precomputed radiance transfer (PRT), which captures the way an object shadows, scatters, and reflects light. PRT records over many surface points a transfer matrix. At run-time, this matrix transforms a vector of spherical harmonic coefficients representing distant, low-frequency source lighting into exiting radiance. Per-point transfer matrices form a high-dimensional surface signal that we compress using clustered principal component analysi ...

**Keywords**: graphics hardware, illumination, monte carlo techniques, rendering, shadow algorithms

7 Finknn: a fuzzy interval number k-nearest neighbor classifier for prediction of sugar production from populations of samples

Vassilios Petridis, Vassilis G. Kaburlasos

September 2003 The Journal of Machine Learning Research, Volume 4

Full text available: pdf(360.76 KB) Additional Information: full citation, abstract

This work introduces FINKNN, a k-nearest-neighbor classifier operating over the metric lattice of conventional interval-supported convex fuzzy sets. We show that for problems involving populations of measurements, data can be represented by fuzzy interval numbers (FINs) and we present an algorithm for constructing FINs from such populations. We then present a lattice-theoretic metric distance between FINs with arbitrary-shaped membership functions, which forms the basis for FINkNN' ...

Multimedia communications, relevance feedback and indexing: Kernel VA-files for relevance feedback retrieva



Douglas R. Heisterkamp, Jing Peng

November 2003 Proceedings f the first ACM international workshop n Multimedia databases

Full text available: pdf(453.37 KB) Additional Information: full citation, abstract, references, index terms

Many data partitioning index methods perform poorly in high dimensional space and do not support relevance feedback retrieval. The vector approximation file (VA-File) approach overcomes some of the difficulties of high dimensional vector spaces, but cannot be applied to relevance feedback retrieval using kernel distances in the data measurement space. This paper introduces a novel KVA-File (kernel VA-File) that extends VA-File to kernel-based retrieval methods. A key observation is that kernel d ...

**Keywords**: VA-Files flexible metrics, content-based image retrieval, indexing, kernel methods, relevance feedback

An observability-based code coverage metric for functional simulation Srinivas Devadas, Abhijit Ghosh, Kurt Keutzer

January 1997 Proceedings of the 1996 IEEE/ACM international conference on Computer-aided design

Full text available: pdf(124.26 KB) Additional Information: full citation, abstract, references, citings, index terms Publisher Site

Functional simulation is the most widely used method for design verification. At various levels of abstraction, e.g., behavioral, register-transfer level and gate level, the designer simulates the design using a large number of vectors attempting to debug and verify the design. A major problem with functional simulation is the lack of good metrics and tools to evaluate the quality of a set of functional vectors. Metrics used currently are based on instruction counts and are quite simplistic. Des ...

**Keywords**: verification, functional simulation, code coverage

10 On the influence of the kernel on the consistency of support vector machines Ingo Steinwart

March 2002 The Journal of Machine Learning Research, Volume 2

Additional Information: full citation, abstract, references, citings, index Full text available: pdf(343.65 KB) terms

In this article we study the generalization abilities of several classifiers of support vector machine (SVM) type using a certain class of kernels that we call universal. It is shown that the soft margin algorithms with universal kernels are consistent for a large class of classification problems including some kind of noisy tasks provided that the regularization parameter is chosen well. In particular we derive a simple sufficient condition for this parameter in the case of Gaussian RBF kernels ...

Keywords: PAC model, computational learning theory, kernel methods, pattern recognition, support vector machines

11 A survey on wavelet applications in data mining

Tao Li, Qi Li, Shenghuo Zhu, Mitsunori Ogihara

December 2002 ACM SIGKDD Explorati ns Newsletter, Volume 4 Issue 2

Full text available: 1 pdf(330.06 KB) Additional Information: full citation, abstract, references

Recently there has been significant development in the use of wavelet methods in various data mining processes. However, there has been written no comprehensive survey available on the topic. The goal of this is paper to fill the void. First, the paper presents a high-level data-mining framework that reduces the overall process into smaller components. Then applications of wavelets for each component are reviewd. The paper concludes by discussing the impact of wavelets on data mining research an ...

12 Special issue on special feature: An extensive empirical study of feature selection metrics for text classification



George Forman

March 2003 The Journal of Machine Learning Research, Volume 3

Full text available: pdf(270.38 KB) Additional Information: full citation, abstract

Machine learning for text classification is the cornerstone of document categorization, news filtering, document routing, and personalization. In text domains, effective feature selection is essential to make the learning task efficient and more accurate. This paper presents an empirical comparison of twelve feature selection methods (e.g. Information Gain) evaluated on a benchmark of 229 text classification problem instances that were gathered from Reuters, TREC, OHSUMED, etc. The results are a ...

13 Survey articles: Data mining for hypertext: a tutorial survey



January 2000 ACM SIGKDD Explorations Newsletter, Volume 1 Issue 2

Full text available: pdf(1.19 MB) Additional Information: full citation, abstract, references, citings

With over 800 million pages covering most areas of human endeavor, the World-wide Web is a fertile ground for data mining research to make a difference to the effectiveness of information search. Today, Web surfers access the Web through two dominant interfaces: clicking on hyperlinks and searching via keyword queries. This process is often tentative and unsatisfactory. Better support is needed for expressing one's information need and dealing with a search result in more structured ways than av ...

14 Session 9: image indexing and retrieval: An effective region-based image retrieval framework



Feng Jing, Mingjing Li, Hong-Jiang Zhang, Bo Zhang

December 2002 Proceedings of the tenth ACM international conference on Multimedia

Full text available: 📆 pdf(216.67 KB) Additional Information: full citation, abstract, references

We present a region-based image retrieval framework that integrates efficient region-based representation in terms of storage and retrieval and effective on-line learning capability. The framework consists of methods for image segmentation and grouping, indexing using modified inverted file, relevance feedback, and continuous learning. By exploiting a vector quantization method, a compact region-based image representation is achieved. Based on this representation, an indexing scheme similar to t ...

**Keywords**: continuous learning, inverted file, region-based image retrieval, relevance feedback

15 Intelligent signal analysis and recognition using a self-organizing database R. Levinson, D. Helman, E. Oswalt

June 1988 Proceedings of the first internati nal conference on Industrial and engineering applications of artificial intelligence and expert systems -V lume 2

Full text available: pdf(1.20 MB) Additional Information: full citation, references, index terms

## <sup>16</sup> Technique for automatically correcting words in text

Karen Kukich

December 1992 ACM Computing Surveys (CSUR), Volume 24 Issue 4

Full text available: pdf(6.23 MB)

Additional Information: full citation, abstract, references, citings, index terms, review

Research aimed at correcting words in text has focused on three progressively more difficult problems:(1) nonword error detection; (2) isolated-word error correction; and (3) contextdependent work correction. In response to the first problem, efficient pattern-matching and n-gram analysis techniques have been developed for detecting strings that do not appear in a given word list. In response to the second problem, a variety of general and applicationspecific spelling cor ...

**Keywords**: n-gram analysis, Optical Character Recognition (OCR), context-dependent spelling correction, grammar checking, natural-language-processing models, neural net classifiers, spell checking, spelling error detection, spelling error patterns, statisticallanguage models, word recognition and correction

## 17 Searching in metric spaces

Edgar Chávez, Gonzalo Navarro, Ricardo Baeza-Yates, José Luis Marroquín September 2001 ACM Computing Surveys (CSUR), Volume 33 Issue 3

Full text available: pdf(916.04 KB)

Additional Information: full citation, abstract, references, citings, index

The problem of searching the elements of a set that are close to a given query element under some similarity criterion has a vast number of applications in many branches of computer science, from pattern recognition to textual and multimedia information retrieval. We are interested in the rather general case where the similarity criterion defines a metric space, instead of the more restricted case of a vector space. Many solutions have been proposed in different areas, in many cases without cros ...

**Keywords**: Curse of dimensionality, nearest neighbors, similarity searching, vector spaces

## 18 Routing: Network routing with path vector protocols: theory and applications João Luis Sobrinho

August 2003 Proceedings of the 2003 conference on Applications, technologies, architectures, and protocols for computer communications

Full text available: T pdf(266.53 KB) Additional Information: full citation, abstract, references, index terms

Path vector protocols are currently in the limelight, mainly because the inter-domain routing protocol of the Internet, BGP (Border Gateway Protocol), belongs to this class. In this paper, we cast the operation of path vector protocols into a broad algebraic framework and relate the convergence of the protocol, and the characteristics of the paths to which it converges, with the monotonicity and isotonicity properties of its path compositional operation. Here, monotonicity means that the weight ...

**Keywords**: BGP, algebra, border gateway protocol, path vector protocols

## 19 Face recognition: A literature survey

W. Zhao, R. Chellappa, P. J. Phillips, A. Rosenfeld

December 2003 ACM Computing Surveys (CSUR), Volume 35 Issue 4

Full text available: pdf(4.28 MB) Additional Information: full citation, abstract, references, index terms

As one of the most successful applications of image analysis and understanding, face







recognition has recently received significant attention, especially during the past several years. At least two reasons account for this trend: the first is the wide range of commercial and law enforcement applications, and the second is the availability of feasible technologies after 30 years of research. Even though current machine recognition systems have reached a certain level of maturity, their success is ...

Keywords: Face recognition, person identification

<sup>20</sup> Think globally, fit locally: unsupervised learning of low dimensional manifolds Lawrence K. Saul, Sam T. Roweis

September 2003 The Journal of Machine Learning Research, Volume 4

Full text available: pdf(2.91 MB) Additional Information: full citation, abstract

The problem of dimensionality reduction arises in many fields of information processing, including machine learning, data compression, scientific visualization, pattern recognition, and neural computation. Here we describe locally linear embedding (LLE), an unsupervised learning algorithm that computes low dimensional, neighborhood preserving embeddings of high dimensional data. The data, assumed to be sampled from an underlying manifold, are mapped into a single global coordinate system of lowe ...

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## A theory for memory-based learning

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Pittsburgh, Pennsylvania, United States

Pages: 103 - 115 Year of Publication: 1992 ISBN:0-89791-497-X

<u>Jyh-Han</u> Lin **Authors** 

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#### **↑ INDEX TERMS**

## **Primary Classification:**

- I. Computing Methodologies
- 1.2 ARTIFICIAL INTELLIGENCE

#### **Additional Classification:**

- E. Data
- E.4 CODING AND INFORMATION THEORY
  - Subjects: Data compaction and compression
- I. Computing Methodologies
- → **I.5** PATTERN RECOGNITION

#### **General Terms:**

Algorithms, Theory, Verification

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## Metric Learning via Normal Mixtures

## Peter N. Yianilos

**Abstract:** Natural learners rarely have access to perfectly labeled data - motivating the study of unsupervised learning in an attempt to assign labels. An alternative viewpoint, which avoids the issue of labels entirely, has as the learner's goal the discovery of an effective metric with which similarity judgments can be made. We refer to this paradigm as {\em metric learning}. Effective classification, for example, then becomes a consequence rather than the direct purpose of learning.

Consider the following setting: a database made up of exactly one observation of each of many different objects. This paper shows that, under admittedly strong assumptions, there exists a natural prescription for metric learning in this data starved case.

Our outlook is stochastic, and the metric we learn is represented by a joint probability density estimated from the observed data. We derive a closed-form expression for the value of this density starting from an explanation of the data as a Gaussian Mixture. Our framework places two known classification techniques of statistical pattern recognition at opposite ends of a spectrum - and describes new intermediate possibilities. The notion of a *stochastic equivalence predicate* is introduced and striking differences between its behavior and that of conventional metrics are illuminated. As a result one of the basic tenets of nearest-neighbor-based classification is challenged.

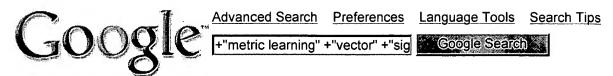
**Keywords:** Nearest Neighbor Search, Metric Learning, Normal/Gaussian Mixture Densities, Unsupervised Learning, Neural Network, Encoder Network.

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- See also:
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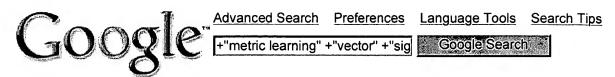
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